

Patients' Satisfaction and Attitude Towards Rubber Dam Usage: A Literature Review

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Received: January 20, 2022

Published: March 02, 2022

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Abstract

Rubber dam use has been considered by the American Association of Endodontics as an integral and essential part of any nonsurgical endodontic treatment. It has been used for isolation of teeth mainly in endodontics, restorative dentistry and also in Pediatric dentistry. Despite all the advantages, rubber dam usage is still not adopted completely in dentistry due to some barriers such as level of patient acceptance, challenge in placement of rubber dam, time required for placement, cost of equipment and material, insufficient training of the operator, discomfort to patient. The literature review shows that the majority of the participants had positive experience towards rubber dam usage in their dental treatment. Aside from it, most of them had a positive attitude towards the rubber dam and preferred to place it in future dental appointments. However, these were mostly influenced by the experience of the operator, time taken to apply rubber dam, current experience, degree of discomfort and explanation given by operator and statistically correlation had been found. There were no significant differences found between age, gender, race, education level and career.

Keywords : Patients' Satisfaction; Patients' Attitude; Rubber Dam; Perception; Acceptance; Compliance

Introduction

Rubber dam was first introduced by Dr Stanford C. Barnum in 1864 and has been used in dentistry ever since [1]. Rubber dam consists of a rubber sheet, a metal clamp and a metal frame [2]. Rubber dam is made up of latex or nitrile usually in a 6 inch square sheet [3]. Rubber dam has been used for isolation of teeth mainly in endodontics and restorative dentistry and now also starting to be used in Pediatric dentistry.

Rubber dam use has been considered by the American Association of Endodontics as an integral and essential part of any nonsurgical endodontic treatment [1]. Main advantages of using rubber

dam in dentistry are it provides dry operating area, improve visibility, minimize patient conversation which improves efficacy of treatment overall, protect against ingestion or inhalation of potentially toxic mucosal and aerosol products containing pathogen or any endodontic instruments, protection and retraction of soft tissues, reduce the penetration of irrigation solution into oral cavity [1,4,5].

Despite all the advantages mentioned, rubber dam usage is still not adopted completely in dentistry due to some barriers such as level of patient acceptance, challenge in placement of rubber dam, time required for placement, cost of equipment and material, insufficient training of the operator, discomfort to patient [4].

Most of the studies previously were directed to dentist or dental student's attitude and satisfaction on the use of rubber dam as the method of isolation. Hence, this study was directed on investigating the satisfaction and attitude of patients on rubber dam usage [6].

This review was done to understand patient satisfaction, experience and attitude towards rubber dam usage during dental treatments. Research articles were collected from a free license open platform.

Methodology

Eligibility criteria

Inclusion criteria were the following:

- Studies investigated patient satisfaction and attitudes on rubber dam usage
- Studies carried out in college or university clinic
- Research articles were collected from a free license platform
- Study designs were cross sectional
- Studies had been published in English.

Exclusion criteria were the following:

- Studies conducted on populations other than dental patients or a combination of populations
- Studies that were letters to editors or review studies.

Search strategy

Key words used for electronic database searches were the following

Patient's attitude, Rubber dam, Patient's satisfaction, Perception, Acceptance, Compliance.

Electronic databases used were the following

Open Journal of Dentistry and Oral Medicine, Journal of Research in Medical and Dental Science, International Research of Environmental Research and Public Health, Indian Journal of Dental Research, World Journal of Dentistry, Journal of Dental and Medical Sciences, International Endodontic Journal, Global Journal of Health Science, Acta Stomat Croat, the Egyptian Journal of Hospital Medicine, Research Gate, PubMed, NCBI, Elsevier

Review of Literature

Studies undertaken in various countries have revealed the patient attitude and satisfaction in usage of Rubber Dam during vari-

ous procedures and among various age groups. Few studies have also been done to understand the differences in rubber dam application by a general dentist and a specialist.

A study conducted by Ibtesam Orafi., *et al.* in 2018, surveyed the attitudes of adult patients in Benghazi towards the use of rubber dam in endodontic treatment and to explore the impact of some personal and clinical factors on the patient's opinion. The study group was categorised to two groups with 100 participants in each, undergoing treatment by Endodontists and General Dental Practitioners respectively. The findings revealed 6% felt their current experience of rubber dam was pleasant, 86.8% comfortable while 7% ranked uncomfortable and none felt pain when using rubber dam under the Endodontist group. However, under General Dental Practitioners, 4.3% stated rubber dam was pleasant, 73% comfortable, whilst 22% claimed it was uncomfortable and 1 found it was painful. Other than that, from the Endodontists group 76.9% said they would prefer rubber dam usage at their next appointment, 12% mentioned no and 11 patients showed no preference. On the other hand in the General Dental Practitioners group 70% said yes, 10% expressed no, with 19 patients expressing no preference towards rubber dam usage at their next appointment. The data showed there was a significant difference between the Endodontists and General Dental Practitioners with regard to the rubber dam experience at the time of conducting the study ($P < 0.05$). Patients have a positive attitude towards rubber dam experience but are affected by time taken to place rubber dam by inexperienced operators [1].

A survey conducted by Ahmad Madarati., *et al.* in 2018 to examine opinions, preferences and experiences of patients using dental-dam isolation during root canal treatment in 305 participants who receive RCTs procedure at the endodontic clinic with a questionnaire. Evidence suggested that there was no significant correlation between patients' preferences and their race, age, gender and education level ($p > 0.05$). 74.3% of participants would prefer to wear a dental dam in their next appointment ($p < 0.001$). Conversely, there was a significant correlation between patient preference in using a rubber dam with the time needed to place a dental dam ($P = 0.001$) and the duration of the current visit ($p < 0.001$). Overall, 76.6% of people who choose to use a dental dam in their future visit were pleased with how it was placed in the current session, 66.7% would not do so as dental dam were uncomfortable [4].

A questionnaire which was pretested consist of 15 questions arranged in 3 sections conducted by Manal Maslamani., *et al.* in

2018 at Kuwait University School of Dentistry. 60% of the participants with previous experience showed satisfaction of the use of rubber dam and majority participants preferred future use of rubber dam in their treatment with $P = 0.001$. Male patients showed 61% and females showed 51% of comfort in the use of rubber dam. Older age group participants showed 70% are satisfied followed by middle age group with 55% of participants are satisfied and the least satisfied participants were from the younger age group with 42% with $P = 0.68$. Participants were more satisfied with 13.8% when treated by Endodontist, 6% when treated by general dentists and only 5% participants satisfied by undergraduate final year students with $P = 0.83$. A P less than or same as 0.05 was considered statistically significant [3].

120 questionnaires were distributed among patients in a survey, which was conducted in 2017 by Basil Yousif Alamassi, *et al.* of which 95 of them were completed and returned. 80% of the respondents stated their first experience using a rubber dam occurred in this particular clinic. Most patients were given a brief explanation on benefits of rubber dam usage before beginning the procedure. There is a significant difference between patients who were comfortable and uncomfortable with rubber dam during the procedure. 4.2% felt it was pleasant, 71.6% felt comfortable, 14.7% uncomfortable and 9.5% said it was painful. 41 patients were unable to rinse during treatment, 12 patients felt difficulty in breathing, 17 patients felt it hard to communicate with the rubber dam in place and some patients felt nauseous and pain in the temporomandibular joint. 29.5% of patients were affected by time taken for application of the rubber dam. These patients found these factors made them dislike rubber dam usage. In contrast to that, 75.8% of the respondents showed preference in using rubber dam in future dental treatments. Most of the patients stated that they will recommend rubber dam usage to others while very few patients denied recommending it [6].

Apart from that article, another survey was conducted on patient attitude with rubber dam usage during root canal treatment in 2016 in a private dental office in Iran by Solmaz Araghi, *et al.* $P < 0.05$ was significant. Among the questionnaires distributed to 70 participants, 7.1% of the patients responded that they felt suffocation when a rubber dam was used during treatment while 92.9% did not. Most patients reported that liquid did not seep into their mouth during treatment. 83.8% of patients stated that they can

swallow spit easily, while 16.2% cannot. Many patients responded that their gums didn't hurt when the rubber dam was placed. It was found that none of the respondents were allergic to rubber dam sheets. 91.3% of the patients stated that the corner of their lips were not hurt due to the wound created following rubber dam placement. Majority of the patients had a high level of satisfaction towards rubber dam usage. Levels of satisfaction were not associated with ages, education level and career but with gender [5].

Erini P Fragouli, *et al.* in 2016 conducted a study on "Rubber dam acceptance by patients treated by undergraduate and postgraduate students" in Dental School of Athens University. A total of 116 with 71 female and 45 male patients' completely filled questionnaires were collected from both groups. Level of significance is $P = 0.05$. Overall, 77.6% of patients were comfortable and preferred using it in the future and only 7.8% of patients were not comfortable with the use of rubber dam and did not prefer the use of it in future. There is a very slight difference with no clear trend observed in the patient experience and future preference on the use of rubber dam between patients treated by undergraduate and postgraduate students. The duration of rubber dam placement and use shows no significance between undergraduate and postgraduate students with $P > 0.05$. Variation in duration of rubber dam use seen within undergraduate students with median (IQR): 90.0(60.0, 120.0) and postgraduate students with median (IQR): 90.0 (70.0, 90.0) [7].

Jiwan Yum, *et al.* from Pusan National University in Korea conducted a survey in 2015 to find the patient's perception on the use of rubber dam in dental treatments. The data were analysed according to factors such as gender, age, previous experience of rubber dam from 106 questionnaires which were collected. Out of the 106 participants, 96% of the patients had never used a rubber dam before, 98% showed interest in using rubber dam in future treatments and 99% of the patients reflected that rubber dam is essential for dental treatments. Great satisfaction was shown by most patients with the rubber dam usage and they also showed consideration in using rubber for selection of dental clinics for future treatments [8].

Martin Kapitan MUDr, *et al.* conducted research in Czech in 2015. Out of 179 questionnaires being distributed, a total of 50 questionnaires were returned. The patients were divided into 3 different groups according to the category of operator, including

General Dental Practitioner, Clinicians and Students. The mean age of patients treated by Student Group, General Dental Practitioner group and Clinician group is 28.5 years, 39.4 years and 39.8 years respectively. The mean time needed for application of the rubber dam is 1.58 minutes by the General Dental Practitioner group, 1.5 minutes by Clinician group and 4.07 minutes by Student Group. Rubber dam placement has been the first experience for 56% of the respondents and 14% had previous experience. Most of the patients had been well-explained about the purpose of the rubber dam and complained less about difficulties in breathing, swallowing and rinsing their mouths. 77% found the treatment to be more comfortable with rubber dam usage while 23% felt the same or lower level of comfort, compared to without rubber dam usage. In addition, 86% of patients prefer to place rubber dam in future treatment, 14% did not express any preference. Significant difference had been found between future preference for rubber dam usage and level of discomfort, explanation [9].

20 male and 20 female patients who needed root canal treatment for mandibular molar teeth have taken part in a short-term study containing 11 questions carried by Vedavathi B et.al in 2011 to find out patients' attitude to rubber dam. Findings indicated that 4 patients described their experience of rubber dam use pleasant, 24 patients comfortable whilst 7 patients felt uncomfortable and 5 patients found it was painful. In addition, 28 patients expressed that they would use the rubber dam for the next appointment, 6 patients had no preference and 6 patients told the rubber dam was not preferred for next time [10].

Josip Filipovic, *et al.* conducted a study in 2004 which was held among the adult patients in Department of Restorative Dentistry and Endodontics, School of Dental Medicine, University of Zagreb. The questionnaires were distributed to 110 patients, among which 60 were treated by students and 50 patients were treated by dental specialists. There was no significant difference between patients who had and had not experience rubber dam in previous treatments. Most of the patients were explained by the dentist before application of rubber dam. Many patients found rubber dam to be useful for both patients and dentist and a very few patients felt its only useful for the dentist. 58.2% of the patients found rubber dam comfortable, 38.2% of patients found it uncomfortable and 3.6% found painful. 69.1% of patients preferred rubber dam usage in future treatments and few patients did not prefer using rubber dam.

The students required more time to apply rubber dam and to perform treatment. Patients showed positive attitude towards rubber dam placement and the patients' attitude was influenced by time taken and the operator's experience [11].

A total of 220 participants have participated in a survey conducted by D. A. Stewardson and E. S. McHugh in 2002 on the patients' attitude on using rubber dam in their treatment. The patients are divided in a way of 100 to the final-year students while the rest of them will be treated by 4 general dental practitioners. 6% of patients managed by the students were pleased with their current rubber dam experience, 52% comfortable, whilst 40% felt uncomfortable and 2% found it was painful. Apart from that, 43% claimed they would prefer to use the rubber dam at the next session, 13% preferred not to use and 44% had no preference. For the patients who were treated by the general practitioners, 11% of them felt the rubber dam was pleasant, 67% comfortable, whereas 21% described it was uncomfortable, and 1% found it was painful. Along with that, 70% stated they would prefer rubber dam placement for future sessions, 4% mentioned no and 26% said no preference. Majority of participants have positive experiences with rubber dam. Aside from it, no statistically significant found between age, sex, procedure, application time ($P = 0.47$), duration of use ($P = 0.34$) and preference for rubber dam usage for future appointment [12].

In Saudi Arabia, Yasmeen Alshammari, *et al.* in 2018 has conducted research by surveying 78 patients on their satisfaction after endodontic treatment. They also surveyed patient satisfaction on rubber dam isolation during the treatment. Among the patients, 42.3% ranked an excellent degree of satisfaction for the rubber dam isolation, 33.3% good while 17.9% graded fair and 6.4% rated poor satisfaction towards rubber dam isolation. Patients' attitudes on the rubber dam clamping procedure have also been recorded. The results follow as 64.1% felt discomfort while putting the clamp whereas 35.9% said no discomfort. Moreover, 71.8% described rubber dam isolation was helpful [13].

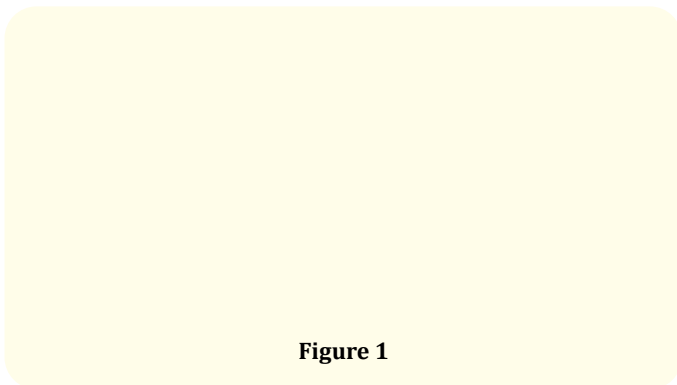
A study conducted by Sara M Bagher, *et al.* in February 2021 in the Jeddah, Saudi Arabia to evaluate the comparison between Dry Shield isolation (DSI) system and rubber dam isolation (RDI) during premolar fissure sealants placement. The sample involves 28 children of 9-15 years with at least a pair of contralateral fully

erupted, caries-free permanent premolars indicated for fissure sealant. Half of the sample had a previous experience with rubber dam isolation while 21.4% of them did not experience any isolation systems. Rubber dam isolation required longer chair-side time for completion of treatment. A few patients also felt slight pain and discomfort with rubber dam isolation. 10 patients showed preference in future usage of RDI [2].

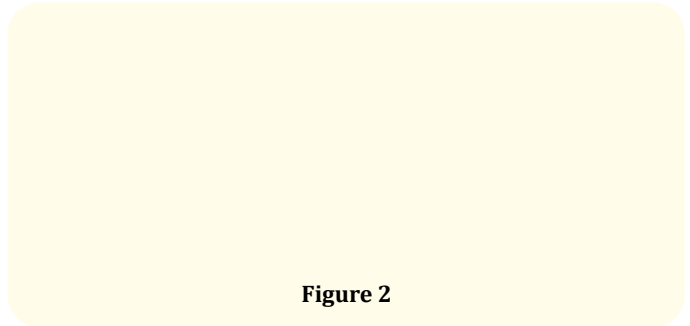
Research on 'Pediatric Dental Patients' attitude to rubber dam use Charles Clifford Dental Hospital was done by McKay, *et al.* in 2013. In this study, attitude of pediatric dental patient to rubber dam use in all treatments such as for root canal treatment, for restoration and for dental radiograph were considered. Self-completion questionnaire consisting of two section was made. First section was to be filled by the practitioner and the second section is to be filled by the patient. A score 0 indicated most negative result and a score 10 showed most positive result. Data collected from 100 patients. Data analysis for simple descriptive statistics were done with SPSS software and to determine significant difference in VAS score t-test was used ($P < 0.05$). Overall acceptance of rubber dam in pediatric patient was satisfactory with mean VAS of 5.0/10. Total of 24% of patients do not prefer a rubber dam use in radiography department with $P < 0.05$ in t-test. In the 24% of patients, one third of patients are concerned about being seen by other patients and they felt self-conscious while wearing rubber dam. A total of 78% of the patients agreed that rubber dam use help both practitioner and patient whereas 9% thought rubber dam use was only to help patient and another 13% of patients thought rubber dam is used only to help the dentist [14].

Results

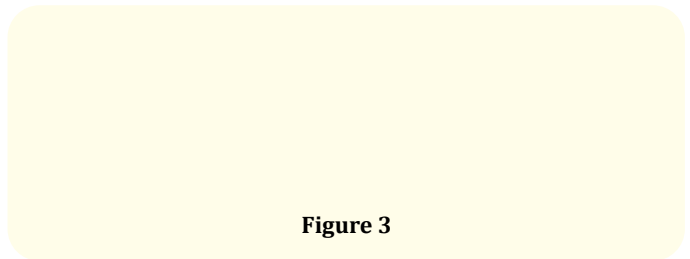
Gender



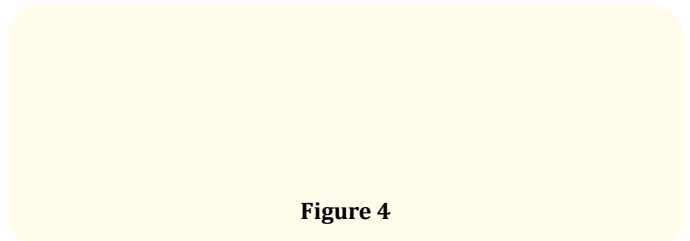
Time taken for rubber dam placement and treatment



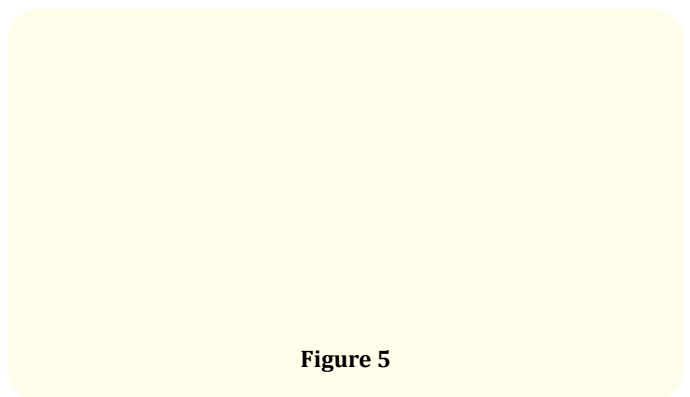
Previous rubber dam experience of patients



Explanation given to patients



Comfort



Rubber dam benefits

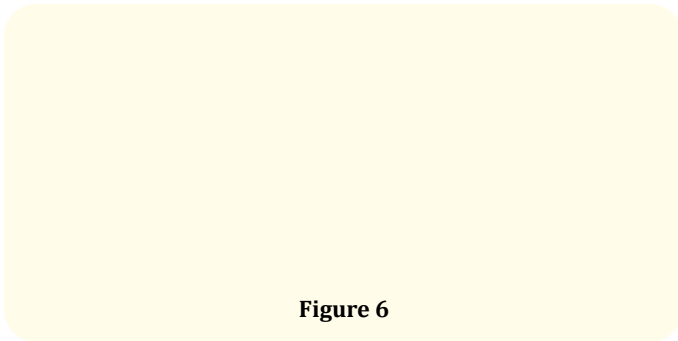


Figure 6

Satisfaction with operator

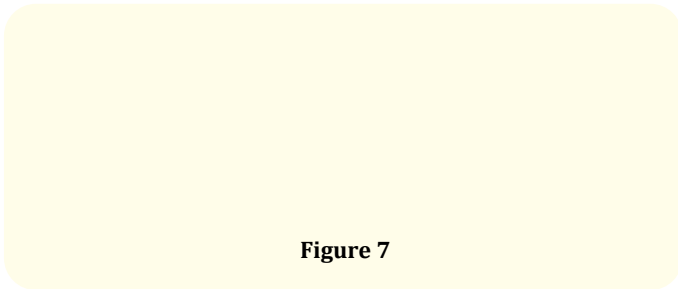


Figure 7

Satisfaction of patients with rubber dam

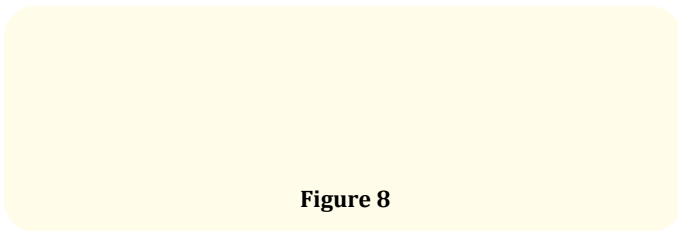


Figure 8

Preference in future treatments

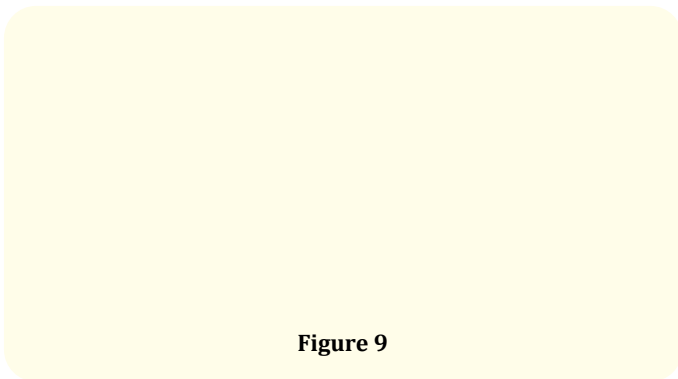


Figure 9

Discussion

Based on the literature review above, the majority of patients have shown positive experiences, positive attitudes and are satisfied with using rubber dams in their treatment [1,4,7]. Although majority of patients have been positive towards usage of Rubber dam, a minor portion of people across various studies conducted by Ibtesam Orafi., *et al.* Vedavathi B., *et al.* Josip Filipovic., *et al.* found it to be uncomfortable and painful [1,10,11]. A very portion of the samples have also reported symptoms like suffocation due to use of rubber dam [5,6]. Studies conducted by Josip Filipovic., *et al.* and D. A. Stewardson., *et al.* showed that there was a slight difference in the number of patients with negative attitude and experience towards rubber dam applied by various levels of experience such as students, General dental practitioners and specialists [11,12]. Among pediatric patients, while the majority were satisfied and had no unpleasant experiences with rubber dam application or usage, only a few preferred it for the future appointments [2,14]. In the study conducted by Martin Kapitan MUDr., *et al.* a smaller number of complaints were noted after the patients were explained well regarding the uses and advantages of Rubber dam [9].

Most patients that were satisfied with the treatment using rubber dam also prefer to use the rubber dam in their future treatment. This is because based on their current experience from the treatments, the operators provided were experts which require less time to apply the rubber dam and the treatment time is shortened.

However, even though the students took longer to apply the rubber dam due to their lack of experience resulting in some of the patients' group not satisfied with the usage of rubber dam, the majority of the students' patients also showed satisfaction towards using the rubber dam in the treatment.

Conclusion

In conclusion, rubber dams are effective in terms of isolation, visibility, patient protection against ingestion or inhalation of pathogens or any endodontic instruments and also protection and retraction of soft tissues. In current dental practice, even though the use of rubber dams is being encouraged, the use of it is still low. Hence, further training, encouragement to use and advancements in rubber dam usage is required to make patients' experience much more compatible in the future.

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